# What is WiFi 8 IoT?

WiFi 8 IoT refers to an intelligent network based on WiFi 8 technology that connects everything, aiming to provide higher reliability, speed and bandwidth to meet the needs of IoT devices for high-speed and stable networks.



Introduction

# WiFi 8 IoT

In the digital age, wireless network technology and the Internet of Things (IoT) have become key forces in promoting social progress and industrial upgrading.



**WiFi 8 IoT for Smart Home**

With the continuous advancement of technology, a new generation of Wi-Fi standards, Wi-Fi 8, has emerged. It not only brings an unprecedented high-speed wireless connection

experience, but also injects new vitality into the development of the Internet of Things.

This article will introduce in detail the technical characteristics of Wi-Fi 8, the basic concepts of the Internet of Things, and the application prospects of Wi-Fi 8 in the field of the Internet of Things, and explore how the two can jointly shape the future smart connected world.

## Wi-Fi 8: A new generation of wireless connection technology

### (I) Overview of Wi-Fi 8

Wi-Fi 8, also known as IEEE 802.11bn UHR (Ultra-High Reliability), is a new generation of Wi-Fi standards being developed by the Wi-Fi Alliance.

The standard is designed to meet future demands for ultra-high reliability and low-latency communications, and to provide strong support for emerging applications such as industrial automation, autonomous driving, telemedicine, augmented reality (AR), and virtual reality (VR).

The research and development of Wi-Fi 8 is already in full swing, and its final specifications are expected to be released around September 2028.

## (II) Technical features of Wi-Fi 8

## 1. Ultra-high reliability and low latency

- **Ultra-high reliability**: Wi-Fi 8 achieves ultra-high reliability of data transmission by introducing a number of innovative technologies, such as multi-AP coordination, orthogonal frequency division multiple access (OFDMA) extension, more flexible spectrum access and more efficient channel utilization.

In the field of industrial automation, Wi-Fi 8 can ensure the accurate transmission of data from production line equipment and avoid accidents caused by network failures. In telemedicine surgery, it provides solid protection for data transmission and improves the safety and feasibility of telemedicine.

- **Low-latency communication**: Wi-Fi 8 plans to reduce the latency of 95% of data packets by about 25%, which is critical for applications that require real-time response. In VR games, players will be able to get rid of the constraints

of latency and enjoy an immersive gaming experience; in AR collaboration, low latency will ensure higher accuracy and efficiency.

2. High-speed data transmission

- **Theoretical maximum speed**: Although both Wi-Fi 8 and Wi-Fi 7 have achieved a theoretical maximum speed of 100Gbps, Wi-Fi 8 is more focused on improving transmission efficiency. By optimizing modulation technology and improving spectrum utilization efficiency, Wi-Fi 8 will break through the performance bottleneck in actual applications, thereby achieving more outstanding performance in large file downloads and high-definition video playback.

- **Multi-user multiple input multiple output (MU-MIMO) technology**: Wi-Fi 8 inherits the MU-MIMO technology of Wi-Fi 7, allowing multiple devices to communicate with the access point (AP) at the same time, improving network throughput and efficiency.

3. Smart antenna technology and beamforming

- **Smart antenna technology**: Wi-Fi 8 uses smarter antenna technology, which can better sense the location and signal strength of the device, thereby dynamically adjusting the antenna's transmission direction and power to improve signal coverage and transmission quality.

- **Beamforming algorithm**: By introducing a more advanced beamforming algorithm, Wi-Fi 8 can more accurately control the transmission direction of the signal, reduce interference between signals, and improve the transmission efficiency and stability of the signal.

4. Multi-access point coordination

- **Channel coordination and transmission coordination**: Wi-Fi 8's multi-access point coordination technology can achieve channel coordination and transmission coordination between multiple APs, avoid channel conflicts and interference, and improve the overall performance of the network.

- **Load balancing and multi-AP joint transmission**: This technology can also dynamically allocate resources according to the network load to achieve load balancing. When necessary, multiple APs can jointly provide services

for one device, providing higher data throughput and a more stable network.

## 5. Spectrum expansion and flexible utilization

- **Spectrum expansion**: Wi-Fi 8 will support more frequency bands, including 6GHz and millimeter wave bands, further expanding the transmission range and capabilities.

- **Flexible utilization**: By introducing more flexible spectrum access technology, Wi-Fi 8 can better adapt to different network environments and application requirements and improve the utilization efficiency of the spectrum.

## Internet of Things: An Intelligent Network of Everything Connected

**WiFi 8 IoT (Internet of Things)**

# (I) Overview of the Internet of Things

The Internet of Things refers to a network that connects various objects to the Internet through information sensing devices such as radio frequency identification (RFID), infrared sensors, global positioning systems, laser scanners, etc., to achieve information exchange and communication, and then realize intelligent identification, positioning, tracking, monitoring and management. The core idea of        the

Internet of Things is to enable objects in daily life (such as household appliances, cars, industrial equipment, etc.) to connect and communicate through the Internet to achieve intelligent and automated control and management.

## (II) Basic characteristics of the Internet of Things

### 1. Massive connectivity

- **Internet of Everything**: The Internet of Things can connect almost all objects in the world, including household appliances, vehicles, industrial equipment, buildings, etc. The number of objects connected through the Internet of Things is huge and growing exponentially.
- **Ubiquitous perception**: Sensors in the Internet of Things can perceive the state and environmental information of objects in real time, providing a basis for subsequent data processing and analysis.

### 2. Data-driven

- **Data collection**: The Internet of Things collects data about objects through sensors and other devices, and transmits and stores it through the network.

- **Intelligent processing**: Use artificial intelligence (AI), machine learning and other technologies to analyze and process the collected data to achieve intelligent perception and decision-making of objects and the environment.

## 3. Intelligent decision-making and control

- **Autonomous decision-making**: The Internet of Things system can make decisions independently based on the processed data to achieve intelligent control and management of objects.
- **Remote control**: Users can remotely control Internet of Things devices through the Internet to achieve convenient and efficient management and control.

## (III) Application areas of the Internet of Things

## 1. Smart home

- **Intelligent control**: Through the Internet of Things technology, users can achieve remote control and intelligent management of home devices, such as smart lighting, smart home appliances, smart security systems, etc.

- **Comfortable experience**: The Internet of Things technology can also automatically adjust the home environment according to the user's habits and preferences to provide a more comfortable living experience.

## 2. Smart City

- **Smart Transportation**: The application of IoT technology in traffic management, such as vehicle tracking, traffic flow control, and smart parking, can effectively alleviate the problems of urban traffic congestion and frequent accidents.

- **Environmental Monitoring**: By deploying various sensors in the city, IoT can monitor environmental indicators such as air quality and noise level in real time, and provide data support for environmental protection.

## 3. Industrial IoT

- **Remote Monitoring**: By installing sensors and monitoring equipment in factories and equipment, IoT can collect and analyze the operating status and production data of

equipment in real time, and improve production efficiency and quality.

- **Predictive Maintenance**: IoT technology can also predict equipment failures based on equipment operating data, perform maintenance in advance, and reduce downtime and maintenance costs.

## 4. Agricultural IoT

- **Precision Agriculture**: Through IoT technology, farmers can monitor the growth environment of crops in real time, such as soil moisture and light, to achieve precise irrigation, fertilization, and other operations, and improve the yield and quality of crops.
- **Smart Farming**: IoT technology can also be applied to the farming industry to monitor and manage the animal growth environment and improve farming efficiency.

## 5. Medical IoT

- **Telemedicine**: Through IoT technology, doctors can remotely monitor the health status of patients, conduct remote diagnosis and treatment, and improve the accessibility and efficiency of medical services.

- **Smart Wear**: IoT technology can also be applied to smart wearable devices, such as smart bracelets and smart watches, to monitor the user's health status and exercise data in real time.

## Application Prospects of Wi-Fi 8 in the IoT Field



**WiFi 8 in the IoT Industry**

## (I) Improving the Connectivity Performance of IoT Devices

## 1. High-speed Data Transmission

- **Large File Transmission**: The high-speed data transmission capability of Wi-Fi 8 enables IoT devices to transmit large files, such as high-definition videos and large software, more quickly.

- **Real-time Data Synchronization**: In the field of industrial automation, Wi-Fi 8 can achieve real-time synchronization of device data to ensure the continuity and stability of the production process.

## 2. Low-latency communication

- **Real-time control**: In remote medical surgery, Wi-Fi 8's low-latency communication capability can ensure that doctors can control surgical instruments in real time, improving the safety and success rate of surgery.

- **Instant response**: In the field of smart homes, Wi-Fi 8's low-latency communication capability can ensure that smart devices respond to user instructions instantly, improving user experience.

## (II) Expanding the coverage of IoT devices

## 1. Smart antenna technology and beamforming

- **Penetrating obstacles**: Wi-Fi 8's smart antenna technology and beamforming algorithm can better penetrate walls and other obstacles, ensuring stable connection of IoT devices in complex environments.

- **Expanding coverage**: By optimizing the transmission direction and power of signals, Wi-Fi 8 can expand the coverage of IoT devices and achieve wider connections.

## 2. Multi-access point coordination

- **Eliminating signal dead spots**: Wi-Fi 8's multi-access point coordination technology can achieve channel coordination and transmission coordination between multiple APs, eliminate signal dead spots and congestion, and ensure stable connection of IoT devices in complex environments.

- **Seamless switching**: In mobile IoT devices, Wi-Fi 8's multi-access point coordination technology can achieve seamless switching between different APs, improving the mobility and stability of devices.

## (III) Enhance the security and reliability of IoT devices

## 1. Ultra-high reliability

- **Accurate data transmission**: Wi-Fi 8's ultra-high reliability can ensure accurate data transmission of IoT devices, avoiding accidents and losses caused by network failures.

- **Fault recovery**: When an IoT device fails, Wi-Fi 8's ultra-high reliability can ensure that the device quickly restores connection and data transmission.



**Wi-Fi 8 IoT Applications in Smart Home Security Monitoring Systems**

## 2. Security Mechanism

- **Authentication and Access Control**: Wi-Fi 8 will further strengthen the authentication and access control mechanisms to ensure that only authorized devices can access the network, preventing unauthorized access and data leakage. This is critical for IoT devices, which often involve user privacy and sensitive information, such as home surveillance cameras, smart door locks, etc.

- **Data Integrity Verification**: Wi-Fi 8 will introduce a more powerful data integrity verification mechanism to ensure that the transmitted data is not tampered with or damaged during transmission. This is especially important for application scenarios such as the Industrial Internet of Things that require high data accuracy.

- **Anti-attack capability**: Wi-Fi 8 will enhance the ability to defend against network attacks, such as providing more effective defense measures against common network attack methods such as DDoS (distributed denial of service) attacks and man-in-the-middle attacks. This will help protect IoT devices from network attacks and ensure the normal operation of devices and the security of data.

(IV) Promote the innovation and development of IoT applications

1. Support for emerging applications

- **Autonomous driving**: Wi-Fi 8's low latency, high reliability, and high-speed data transmission capabilities will provide strong support for autonomous driving technology. Autonomous vehicles need to transmit a large amount of sensor data and control instructions in real time, and have extremely high requirements for network latency, reliability, and bandwidth. Wi-Fi 8 will be able to meet these requirements and promote the rapid development and application of autonomous driving technology.

- **Telemedicine**: Wi-Fi 8 will provide more reliable and efficient network connections for telemedicine. Telemedicine requires real-time transmission of high-definition video, audio, and medical data, and has strict requirements for network stability and latency. Wi-Fi 8 will be able to ensure the smooth progress of telemedicine and improve the accessibility and quality of medical services.

- **Smart manufacturing**: In the field of smart manufacturing, Wi-Fi 8 will support the interconnection and intelligent management of equipment within the factory. By transmitting equipment status, production data, and quality control information in real time, Wi-Fi 8 will help manufacturing companies realize the visualization and intelligence of the production process, improve production efficiency and product quality.

2. Upgrade of traditional applications

- **Smart home**: Wi-Fi 8 will promote the upgrade and innovation of smart home applications. Smart home devices require stable and high-speed network connections to achieve remote control and intelligent management. Wi-Fi 8 will provide more reliable and efficient network connections, allowing smart home devices to serve users more intelligently and conveniently.

- **Smart city**: In the construction of smart cities, Wi-Fi 8 will support the intelligent upgrade and management of urban infrastructure. By transmitting information such as urban operation data, environmental monitoring data and traffic flow data in real time, Wi-Fi 8 will help city managers

better understand the operation status of the city and formulate more scientific urban planning and management strategies.

## (V) Promote the coordinated development of the Internet of Things industry

## 1. Industry chain integration

- **Promote cooperation between upstream and downstream enterprises**: The promotion and application of Wi-Fi 8 will promote the cooperation and coordinated development of upstream and downstream enterprises in the Internet of Things industry chain. Upstream chip manufacturers and equipment suppliers will provide more advanced and reliable hardware support; downstream application developers and system integrators will develop more innovative and practical IoT applications; and operators will provide better quality and more efficient network services.

- **Promote the standardization process**: The standardization process of Wi-Fi 8 will promote the standardization development of the IoT industry. By formulating unified technical standards and specifications,

the IoT industry will achieve more efficient and coordinated development, reduce industry costs, and improve industry competitiveness.

## 2. Market expansion and opportunities

- **Expand new markets**: The promotion and application of Wi-Fi 8 will expand new space in the IoT market. With the continuous maturity and popularization of Wi-Fi 8 technology, more and more IoT applications will emerge, bringing new growth points and opportunities to the market.

- **Promote industrial upgrading**: Wi-Fi 8 will promote the upgrading and transformation of the IoT industry. The traditional IoT industry will achieve intelligent and efficient development with the help of Wi-Fi 8's technical advantages; while the emerging IoT industry will rely on Wi-Fi 8's technological innovation to achieve rapid development and breakthroughs.

## Challenges and coping strategies faced by Wi-Fi 8 in the field of IoT

**Building an IoT smart home**

(I) Challenges faced

1. Technical compatibility

- **Compatibility with existing devices**: As a new generation of wireless connection technology, Wi-Fi 8 needs to be compatible with existing Wi-Fi devices. However, due to technical differences and limitations, Wi-Fi 8 may have compatibility issues with some old devices, which may affect the connection and stability of IoT devices.

- **Coexistence with other wireless technologies**: In the IoT environment, there may be multiple wireless technologies coexisting, such as Bluetooth, Zigbee, etc. Wi-Fi 8 needs to effectively coexist and work together with these wireless technologies to avoid mutual interference and influence.

2. Security risks

- **Cyber attack risks**: With the popularization and expansion of the scope of application of IoT devices, the risk of cyber attacks has also increased. As an important connection method for IoT devices, Wi-Fi 8 may become a target of cyber attacks. Once the Wi-Fi 8 network is attacked or cracked, it may lead to serious consequences such as loss of control of IoT devices and data leakage.

- **Privacy leakage risk**: IoT devices involve user privacy and sensitive information, such as home surveillance cameras, smart door locks, etc. If there are security vulnerabilities or hidden dangers in the Wi-Fi 8 network, it may lead to the leakage and abuse of user privacy.

3. Deployment cost

- **Hardware upgrade cost**: In order to support Wi-Fi 8 technology, IoT devices may need to upgrade or replace hardware. This will increase the deployment cost and maintenance cost of the equipment, which may be a challenge for some IoT applications with limited budgets.

- **Network infrastructure investment**: The promotion and application of Wi-Fi 8 requires corresponding network infrastructure support. Operators need to invest a lot of money to upgrade and optimize network infrastructure to meet the technical requirements and user needs of Wi-Fi 8.

(II) Countermeasures

1. Strengthen technology research and development and standardization

- **Improve technical compatibility**: Improve the compatibility of Wi-Fi 8 with existing devices by strengthening technology research and development and standardization. Formulate unified technical standards and specifications to ensure that Wi-Fi 8 can achieve effective connection and communication with various IoT devices.

- **Coexistence with other wireless technologies**: Study the coexistence mechanism of Wi-Fi 8 and other wireless technologies to ensure that they can work together in the same environment to avoid mutual interference and influence.

2. Strengthen security protection measures

- **Improve network security**: Adopt more advanced encryption technology and security mechanisms to improve the security of Wi-Fi 8 networks. Strengthen the detection and defense capabilities of network attacks to ensure the security and stable operation of IoT devices.

- **Protect user privacy**: Strengthen protection measures for user privacy to ensure that the security and privacy of user data are not leaked or abused. Formulate strict privacy policies and data management systems to regulate the data collection, storage and use of IoT devices.

3. Reduce deployment costs

- **Promote hardware upgrades and replacements**: Promote hardware upgrades and replacements of IoT devices through policy guidance and market mechanisms. Provide

preferential policies and financial support to encourage enterprises to adopt advanced Wi-Fi 8 technologies and reduce deployment and maintenance costs.

- **Increase investment in network infrastructure**: Governments and enterprises should increase investment in network infrastructure, upgrade and optimize network infrastructure, and meet the technical requirements and user needs of Wi-Fi 8. At the same time, promote competition and cooperation among operators, reduce network usage costs, and improve network service quality and efficiency.

**Wi-Fi8 Internet of Things**


## Conclusion

As a new generation of wireless connection technology, Wi-Fi 8 will inject new vitality into the development of the Internet of Things. By providing advanced technical features such as ultra-high reliability, low-latency communication, and high-speed data transmission, Wi-Fi 8 will meet the high requirements of future Internet of Things applications for wireless networks and promote the innovation and development of Internet of Things applications.

At the same time, Wi-Fi 8 also faces challenges such as technical compatibility, security risks, and deployment costs.

In order to meet these challenges, it is necessary to strengthen technical research and development and standardization, strengthen security protection measures, and reduce deployment costs. I believe that with the joint efforts of all parties, Wi-Fi 8 will play an important role in the field of the Internet of Things and lead the new era of wireless connection and smart interconnection in the future.

**What is iot wifi8**

## About IoT Cloud Platform

IOT Cloud Platform (blog.iotcloudplatform.com) focuses on IOT solutions, low-altitude economic IoT, low-altitude economic equipment suppliers, sensors, smart homes, smart cities, IoT design, RFID, lora devices, IoT systems, IOT modules, embedded development, IoT circuit boards, Raspberry Pi development and design, Arduino programming, programming languages, new energy, semiconductors, WiFi IoT, smart

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